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EXAMINER	
LEE, PING	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/531,632	SEO ET AL.	
	Examiner	Art Unit	
	Ping Lee	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,5,8,9 and 12-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,5,8,9 and 12-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 4, 6, 8, 9 and 12-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 specifies a "method for generating a three-dimensional audio scene with a sound source whose spatiality is extended". The amended claim 1 includes the limitation that "wherein the spatiality extension information of the sound source includes sound source dimension information that is expressed as x0-Δx, y0-Δy, z0-Δz; x0, y0, z0; and x0+Δx, y0+Δy, z0+Δz", and "the spatiality extension information of the sound source includes direction information of the sound source extended spatially". Although Fig. 2 and the corresponding page 7, line 34 through page 8, line 13 of the specification support the newly added limitation ("sound source dimension information that is expressed as x0-Δx, y0-Δy, z0-Δz; x0, y0, z0; and x0+Δx, y0+Δy, z0+Δz"), this embodiment does not match some of the other limitations as specified in claim 1. The claimed invention intends to use spatiality extension information (read on lines 8-9 of claim 1) to simulate "a sound source whose spatiality is extended" (the purpose being

defined in the preamble of claim 1). The spatiality extension information includes the size and shape of the sound source (read on line 10 of claim 1). The size of the sound source is determined by a difference of coordinates in the three-dimensional space from the center of the sound source represented by the spatiality extension information (lines 11-13). These statements in claim 1 seem to match the embodiment as illustrated in Fig. 4 and Fig. 3, not Fig. 2. The embodiment as illustrated in Fig. 2 does not include the spatiality extension information as claimed. It appears that the newly amended claim 1 combines two separated embodiments disclosed in the specification as originally filed while the specification as originally filed fails to disclose such an embodiment that encompasses the embodiments as illustrated in Fig. 2 with Figs. 3-4.

Claim 5 and 9 have the similar limitation as in claim 1.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1,4, 5, 8, 9 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Potard et al. (hereafter Potard) ("Using XML Schemas to Create and Encode Interactive 3-D Audio Scenes for Multimedia and Virtual Reality Applications") in view of Pihkala et al. (hereafter Pihkala) ("Proceedings of the 2003 International Conference on Auditory Display").

In view of the 112, 1st paragraph rejection above, the claims have been rejected under broadest interpretation.

The similarities between the claimed invention specified in claims 1, 5 and 9 with Potard will be compared, discussed and addressed first. Their differences will be addressed immediately follow.

Regarding claims 1 and 9, Potard discloses a method for generating a three-dimensional audio scene (see title) with a sound source whose spatiality is extended (as discussed under “Introduction”, a complex object is usually made of several individual sound objects; for example, in order to simulate a choir, a singer object is duplicated many times with a position change, each singer object represents a single singer; see section 2.3.1 ; the locations of the plurality of singer objects represent how the spatiality is extended), comprising the steps of:

a) generating a sound object (the choir) composing the audio scene (for example, as illustrated in Fig. 5); and

b) generating three-dimensional audio scene description information (see Table 1, several objects in the scene are defined by their corresponding parameters) including sound source characteristics information for the sound object (e.g., describing the environment and the choir based on each singer object; see section 2.3.1), the three-dimensional audio scene description information including a plurality of point sound sources (multiple duplicated singer objects) that model the sound source (the choir), wherein the sound source characteristics information includes spatiality extension information of the sound source, said spatiality extension information enabling the sound source to include more than one dimension, and includes the size (how many

times that the singer object is being duplicated) and shape of the sound source expressed in a three-dimensional space (e.g., the layout of the choir).

Regarding claim 5, Potard discloses a method for consuming a three-dimensional audio scene (see title) with a sound source whose spatiality is extended (as discussed under "Introduction", a complex object is usually made of several individual sound objects; for example, in order to simulate a choir, a singer object is duplicated many times with a position change, each singer object represents a single singer; see section 2.3.1), comprising the steps of:

a) receiving (through WEB for example with full description of sound scenes; see section 1) a sound object composing the audio scene and three-dimensional audio scene description information (see Table 1, many objects in the scene are defined by their corresponding parameters) including sound source characteristics information for the sound object (see section 3.1), the three-dimensional audio scene description information including a plurality of point sound sources that model the sound source (under "Introduction", several individual sound objects model the macro-object; if choir is the claimed sound source, then the plurality of duplicated singer objects are the point sound sources); and

b) outputting the sound object based on the three-dimensional audio scene description information ("3-D Sound" in Fig. 6),

wherein the sound source characteristics information includes spatiality extension information, said spatiality extension information enabling the sound source to include more than one dimension, and includes the size and shape of the sound source

expressed in a three-dimensional space (see rejection for claim 1). The sound object (e.g. choir) includes a plurality of point sound source (plurality of duplicated singer objects).

Potard fails to show that the size of the sound source is determined by a difference of coordinates in the three-dimensional space from a center of the sound source represented by the spatiality extension information as specified in claims 1, 5 and 9. Potard teaches that the size and shape of the sound source would be defined by parameters, but fails to explicitly teach how to do so in terms of using the coordinates. Pihkala teaches that the size of the sound source could be determined by a difference of coordinates ("by adding front, back and depth attributes" in sect. 3.1) in the three-dimensional space from a center of the sound source represented by the spatiality extension information. Potard teaches using XML to describe the audio scenes. Pihkala specifically and explicitly teaches that his/her method of extending the sound source could be applied to any XML based rendering language (see abstract). Thus, it would have been obvious to one of ordinary skill in the art to modify Potard in view of Pihkala by defining the size of the sound source based on the difference of the coordinates from the center of the sound source in order to provide a way to define the sound source having three dimensions.

With respect to the limitation "wherein the spatiality extension information of the sound source further includes geometrical center location information of the sound source dimension information", both Potard and Pihkala suggest the center location information. In Potard, an example is provided to demonstrate the geometrical location

information of a source in section 2.5.2. When the single object is duplicated many times in Potard, the original object could be located in the center with the duplicated objects to be arranged surrounding the original object. In Pihkala, section 3.1 states that "these are extended with a similar system for third dimensions by adding front, back, and depth". So a center location information is inherently provided as a reference point in order to add the extended information to the front, back and depth.

Potard also fails to explicitly show that the plurality of point sound sources are located on a surface defined by the three-dimensional space. Potard teaches how to define a macro-object (e.g., the choir) by grouping several point sound sources (a singer object), cloning the same point sound source or so on (see section 2.3.1). The specific examples provided by Potard are a choir (Fig. 1) and an automobile ("Introduction"). Comparing Potard with the claimed language, the claimed sound object reads on the choir, for example, and the plurality of point sound sources read on many cloned singer objects. Potard suggests that one can also define other macro objects, such as a Jazz Band, a speaker or a crowd, as well. One skilled in the art could see that each of the suggested complex sound sources has its own unique shape and size occupied in a three-dimensional space. Potard implies that a complex sound source with specific dimension occupied in three-dimensional space could be defined by several cloned point sound sources. A complex sound source defined by a plurality of point sound sources (multiple cloned sound sources) located on a surface is just a specific type of complex sound source. Potard even teaches "using one 'splash' sound repeated many times over a surface" in section 2.3.1. By providing each cloned point

sound source with a position change, the locations of the point sound sources at the boundaries inherently provide information on the size and shape of the sound source.

Potard fails to show that the plurality of the point sound source are distributed uniformly over a surface defined by the three-dimensional space. One of the examples provided by Potard is simulating a choir by duplicating a single singer multiple times. It was well known to the general public that the singers in a choir could be arranged in different layouts depending on the instruction from the music director/conductor. However, one common layout is to arrange a plurality of singers uniformly on multiple parallel straight/curved lines. A surface is formed by these uniformly distributed singers. With this layout, the claimed "the plurality of point sound sources are distributed uniformly over a surface defined by the three-dimensional space" is met. Of course, Potard as a whole does not intend to limit the specific layout for each macro sound source. Thus, it would have been obvious to one of ordinary skill in the art to modify Potard and Pihkala to define a specific complex sound source by allowing the user to determine how to duplicate each point sound source (e.g. the single singer) in terms of its location with respect to other point sound source, such as uniformly distributed the point sound sources over a surface, in order to simulate the sound effect of the particular macro sound object that having specific layout with its size and shape for the audio scene.

Regarding claims 13-15, Potard discloses that the spatiality extension information of the sound source includes sound source dimension information that is

expressed as three components of a set of three-dimensional coordinates (section 2.5.2) with a geometrical center location information (original location).

Regarding claims 4, 8 and 12, Potard discloses that the spatiality extension information of the sound source further includes direction information of the sound source (for example the directivity of the macro-object defining choir) and describes a three-dimensional audio scene by extending the spatiality of the sound source in a direction vertical to the direction of the sound source (by duplicating macro-object in a direction vertical to the direction of the directivity of the macro-object defining choir).

Response to Arguments

5. Applicant's arguments filed 8/6/10 have been fully considered but they are not persuasive.

Applicant argued that, on p. 7 of the remarks, that Figs. 3 and 4 describe a new field that may be added to the DirectiveSound nodes shown in Fig. 2 because the specification as originally field discloses such. Applicant implied that Fig. 3 can be combined with Fig. 2. Without giving any further disclosure and/or suggestion on how to add a new field to the original embodiment, one skilled in the art would have expected that all fields in the original embodiment (Fig. 2) would be maintained. However, this does not make sense if every field in Fig. 2 is combined with every field in Fig. 3. The embodiment as shown in Fig. 2 illustrates how to define three separate point sound sources (SOUND1, SOUND2 and SOUND3) separately. One clear indication is the location field. For SOUND1, the location is x0+dx, y0+dy, z0+dz. Although applicant

uses the term “dx”, “dy” and “dz”, one skilled in the art would have understood that they correspond to the claimed “Δx”, “Δy” and “Δz” respectively. For SOUND2, the location is x0, y0, z0. For SOUND3, the location is x0-dx, y0-dy, z0-dz. In Fig. 2, the sound object is defined by the three separate point sound sources with its distinct coordinates defined separately (see lines 5-8 of p. 8 of the specification). Fig. 3 illustrates a different embodiment with respect to Fig. 2. The distinct coordination for the three point sound sources have disappeared. A sound object is defined by one single coordinates plus other fields. The location field, “0, 0, 0”, represents the center of the sound object. This matches to the claimed “a center of the sound source” (line 12 of claim 1). The sourceDimensions field, “0, 0, 0”, represents how the sound object's spatiality is extended. See lines 8-11 of p. 9 of the specification, “The dimension of the sound source is extended in vertical to a vector defined in the direction field based on the value of the “SourceDimensions” field”. In Fig. 2, every point sound source is defined under DirectSound; whereas in Fig. 3, there is only one DirectSound for the whole sound object. Claim 1 specifies that “geometrical center location information representing a center point of the sound source” (lines16-17). Technically, SOUND2 as defined in Fig. 2 can read on this. However, on line 12-13 of p. 9, the original specification explicitly states that the embodiment as illustrated in Fig. 3 has a geometrical center. However, Fig. 3 does not have “the sound source dimension information that is expressed as x0-Δx, y0-Δy, z0-Δz; x0, y0, z0; and x0+Δx, y0+Δy, z0+Δz” as specified in the claimed. The claimed coordinates are shown in Fig. 2. However, Fig. 2 does not have direction information of the sound source extended

spatially as claimed. Applicant indicated that Fig. 3 is be added with Fig. 2 in the remarks. However, this would create conflicts, such as location fields and soundDimension field. Furthermore, if one has already defined the sound object using the definition as shown in Fig. 3, why wound one to keep the other fields as shown in Fig. 2? For example, the center of the sound object, 0, 0, 0, is defined in the location field and the extension is defined in sourceDimension field in Fig. 3, why one needs to include x0-Δx, y0-Δy, z0-Δz; x0, y0, z0; and x0+Δx, y0+Δy, z0+Δz as illustrated in Fig. 2?

Applicant argued that Potard fails to disclose that the spatiality extension information of the sound source includes direction information of the sound source extended spatially. This is not persuasive. For example, by cloning a singer object and placing the cloned singer objects at certain position, the boundary of the choir inherently provides the direction of the sound source extended spatially. In other words, the size and shape of the choir also provides direction information because the choir could be extended from a single singer object to multiple singer objects in one row to many more singer objects in several rows (going sideway or up/down). Furthermore, Pihkala teaches using Δx, Δy and Δz to express the spatial extension. These expressions include direction information.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Lee whose telephone number is 571-272-7522. The examiner can normally be reached on Wednesday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian C. Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ping Lee/
Primary Examiner, Art Unit 2614

pwl